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STUDY ON POST-HARVEST LIFE OF CUT ROSE CV. FIRST RED AS AFFECTED BY DIFFERENT CHEMICALS AND WRAPPING MATERIALS

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ABSTRACT: An investigation was carried out to find the effect of different chemicals as pulsing solutions ($CaCl_2$ 1%, Sucrose 5% + 8HQC 150 ppm, Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for duration of 20 and 24 h) and wrapping materials (Newspaper, Butter paper and Cellophane sheet for duration of 16 h) on the quality and vase life of cut rose cv. First Red. Results obtained show that all treatments performed better than that of control. Among all the treatments, A_2C_2 (cut rose pulsed with Sucrose 5% + 8HQC 150 ppm for 20 h and packaged with Butter paper for 16 h) recorded the maximum increase in quality and vase life of 12.34 days. Whereas the treatments A_2C_0 (pulsed with Sucrose 5% + 8HQC 150 ppm for 20 h only) and A_0C_2 (packaged with Butter paper for 16 h only) recorded a vase life of 11.13 days and 11.02 days, respectively. However, in control treatment (A_0C_0) the vase life recorded was 8.53 days.

Keywords : *Cut rose, pulsing, wrapping, duration, post-harvest life*

Rose is one of the major cut flower, well adapted to various climatic conditions and occupies the premier position in the domestic and international markets. Cut rose are highly perishable in nature and need to be treated to improve their vase life and postharvest quality. They are deprived of their natural sources of water and nutrients after harvest. The major constraints in export of cut roses from our country are poor packaging, inadequate facilities in transport and treatments required to facilitate prolonged shelf life. Added and ideal package is necessary to maintain low rate of respiration and transpiration. It is therefore, important to workout postharvest management of roses to minimize losses and make rose growing more remunerative (Bhattacharjee, 2*)*. Hence, present study was undertaken to find out the response of effective pulsing solution and suitable packaging materials to prolong the vase life of cut rose cv. First Red.

MATERIALS AND METHODS

The experiment was conducted in the research laboratory of Department of Horticulture, C.C.S University Campus Meerut during 2007-2008. The cultivar First Red of cut rose was procured from Ikram 'G' Florist, Begum Bridge Meerut. The cut rose stems were harvested early in the morning at tight bud stage between 7.00-8.30 am and were brought to the laboratory by placing them in a bucket containing fresh water. The flowers were recut to a uniform length of 35 cm and only three uppermost leaves were retained. The maximum and minimum temperatures fluctuated between 17-22°C and relative humidity was 60-75% during the course of investigation. The different chemicals/pulsing solutions used for pulsing cut rose stems are $CaCl_2$ 1% (A_1), Sucrose 5% + 8HQC 150 ppm (A_2), Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm (A_3) for duration of 20 h and 24 h and different wrapping materials used for packaging are Newspaper (C_1), Butter paper (C_2) and Cellophane sheet (C_3) for duration of 16 h. After different treatments of pulsing and packaging the cut rose stems were kept individually in equal sized test tubes containing 60 ml of distilled water for vase life evaluation. However, the control treatment A_0C_0, where no pulsing or packaging was done, the stems were directly placed in distilled water for evaluation. The present experiment was laid out in factorial randomized block design consisting of sixteen treatments, each of them replicated thrice. Observations were recorded changes in fresh

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weight, flower diameter, water uptake and vase life of cut rose stems.

RESULTS AND DISCUSSION

All the pulsing and wrapping treatments were found to be superior over the control treatment (Table 1). Among all the treatment combinations of pulsing and wrapping, A_2C_2 (flowers pulsed with Sucrose 5% + 8HQC 150 ppm for 20 h and packaged with Butter paper for 16 h) recorded the highest gain in fresh weight of 2.71 g followed by 2.59 g in A_2C_3 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Cellophane sheet for 16 h) and 2.50 g in A_3C_2 (pulsing with Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for 24 h and packaging with Butter paper for 16 h) on 3rd day in vase as revealed in Table 1. The increase in fresh weight before senescence was also reported by Pal *et al.* (10). However, the treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing but packaging with Butter paper for 16 h) recorded the gain in fresh weight of 2.29 g and 1.90 g respectively on 3rd day as shown in Table 1. Similar reports of gain in fresh weight and vase life of cut rose have been reported by Beaura and Singh (1), Srivastava *et al*., (14) and Paine and Paine (9). In control treatment A_0C_0, gain in fresh weight recorded was 1.10 g.

The least reduction in fresh weight at senescence recorded was -1.33 g in treatment A_2C_2 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Butter paper for 16 h) followed by -1.52 g in A_2C_3 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Cellophane sheet for 16 h) as revealed in Table 1. However, in treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing with Butter paper packaging) the reduction in fresh weight of -2.37 g and -2.46 g at senescence was observed. In control treatment A_0C_0, the reduction in fresh weight at senescence was -2.96 g (Table 1). Similar report of least reduction in fresh weight at senescence was reported by Singh (12). Matile and Winkenbach (7) reported the loss in fresh weight at senescence due to reduced level of starch and proteins. Similarly Nowak and Rudnicki (8) reported that microorganism growing in vase water cause vascular blockage and produce ethylene, which accelerates senescence in cut flowers.

Data (Table 1) indicates that the maximum flower diameter of 3.38 cm on 3rd day in vase was recorded in treatment A_2C_2 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Butter paper for 16 h) followed by 3.28 cm in A_2C_3 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Cellophane sheet for 16 h) and 3.20 cm in A_3C_2 (pulsing with Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for 24 h and packaging with Butter paper for 16 h). However, the treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing with Butter paper packaging for 16 h) recorded the maximum flower diameter of 3.08 cm and 3.03 cm on 3rd day as shown in Table 1. In control treatment A_0C_0, the flower diameter on 3rd day recorded was 2.94 cm (Table 1). The maximum flower diameter after complete opening 4.31 cm was recorded in treatment A_2C_2 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Butter paper for 16 h) followed by 4.18 cm in A_2C_3 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Cellophane sheet for 16 h) and 4.04 in A_3C_2 (pulsing with Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for 24 h and packaging with Butter paper for 16 h) as evident from Table 1. However, the treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing with butter paper packaging for 16 h) recorded the flower diameter of 3.82 cm and 3.78 cm after complete opening. In control treatment (A_0C_0), the flower diameter after complete opening recorded was 3.68 cm (Table 1). Similar results of increase in flower diameter were reported by De and Bhattacharjee (3), Sivaswamy and Bhattacharjee (13) and Beaura and Singh (1).

The maximum water uptake on 3rd day 12.89 ml was recorded in treatment A_2C_2 (cut roses pulsed with Sucrose 5% + 8HQC 150 ppm for 20 h

Table 1: Post-harvest life of cut rose cv. First Red as affected by different chemicals and wrapping materials.

Treatment	Changes in Fresh Weight (g)		Changes in Flower Diameter (cm)		Changes in Water Uptake (ml)		Vase Life (days)
	on the 3rd day in vase	at senescence day	on the 3rd day in vase	after complete opening	on the 3rd day in vase	at senescence day	
A_1C_1	2.31	-2.33	3.09	3.86	11.10	31.07	11.19
A_1C_2	2.46	-2.14	3.16	3.95	11.72	31.82	11.52
A_1C_3	2.46	-2.20	3.12	3.92	11.36	31.40	11.50
A_1C_0	2.15	-2.40	3.03	3.78	10.99	30.84	11.05
A_2C_1	2.43	-2.25	3.11	3.91	11.36	31.14	11.43
A_2C_2	2.71	-1.33	3.38	4.31	12.89	33.66	12.34
A_2C_3	2.59	-1.52	3.28	4.18	12.11	32.82	12.14
A_2C_0	2.29	-2.37	3.08	3.82	11.05	31.03	11.13
A_3C_1	2.49	-2.07	3.19	4.03	11.77	32.40	11.60
A_3C_2	2.50	-1.91	3.20	4.04	12.03	32.68	11.74
A_3C_3	2.42	-2.32	3.10	3.91	11.22	31.10	11.23
A_3C_0	2.27	-2.38	3.07	3.80	11.02	30.93	11.12
A_0C_1	1.25	-2.91	3.01	3.73	10.76	30.06	10.87
A_0C_2	1.90	-2.46	3.03	3.78	10.96	30.82	11.02
A_0C_3	1.25	-2.67	3.02	3.76	10.92	30.48	10.97
A_0C_0	1.10	-2.96	2.94	3.68	10.74	29.21	8.53
C.D (P=0.05)	0.39	0.42	0.02	0.03	0.34	2.11	0.17

and packaged with Butter paper for 16 h) followed by 12.11 ml in A_2C_3 (flowers pulsed with Sucrose 5% + 8HQC 150 ppm for 20 h and packaged with Cellophane sheet for 16 h) and 12.03 ml in A_3C_2 (pulsing with Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for 24 h and packaging with Butter paper for 16 h) as revealed in Table 1. However, the treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing with Butter paper packaging for 16 h) recorded the maximum water uptake of 11.05 ml and 10.96 ml on 3rd day in vase as shown in Table 1. In control treatment A_0C_0 (no pulsing and no packaging), the water uptake on 3rd day recorded was 10.74 ml (Table 1). The maximum water uptake 33.66 ml at senescence was recorded in treatment A_2C_2 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Butter paper for 16 h) followed by 32.82 ml in A_2C_3 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Cellophane sheet for 16 h) and 32.68 ml in A_3C_2 (pulsing with Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for 24 h and packaging with Butter paper for 16 h) as evident from Table 1. However, the treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing with butter paper packaging for 16 h) recorded the water uptake of 31.03 ml and 30.82 ml at senescence (Table 1) In control treatment A_0C_0, the water uptake at senescence recorded was 29.21 ml.

Increased water uptake was achieved by maintenance of cell integrity which was also confirmed by Halevy and Mayak (4). Similar results of increase in water uptake were reported by Jothi and Balakrishnamoorthy (5) and Reddy *et al.* (11).

Data (Table 1) indicates that the maximum vase life 12.34 days was recorded in treatment A_2C_2

(pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Butter paper for 16 h) followed by 12.14 days in A_2C_3 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and packaging with Cellophane sheet for 16 h) and 11.74 days in A_3C_2 (pulsing with Sucrose 3% + $Al_2(SO_4)_3$ 300 ppm for 24 h and packaging with Butter paper for 16 h). However, the treatments A_2C_0 (pulsing with Sucrose 5% + 8HQC 150 ppm for 20 h and no packaging) and A_0C_2 (no pulsing with Butter paper packaging for 16 h) recorded the vase life of 11.13 days and 11.02 days, respectively. In control treatment A_0C_0, the maximum vase life recorded was 8.53 days (Table 1).

Similarly Jothi and Balakrishnamoorthy (5) reported that quality and longevity of cut rose can be improved by treating them with specific pulsing solutions and packaging materials. According to Kaul (6) the chemicals 8HQC and alumunium sulphate directly improved the vase life by minimizing bacterial damages and acidifying the vase solution. The water retention property of Butter paper is better than the other uncoated papers and is hygroscopic in nature (Paine and Paine, 9). Cellophane sheet has thin foil which permits partial gas exchange, thus preventing injury due to excess CO_2 (Bhattacharjee, 2).

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